

SUNSHINE AND CLOUDINESS.

GENERAL REMARKS.

The quantity of sunshine, and therefore of heat, received by the atmosphere is a fundamental factor in meteorology; the quantity received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends largely upon the absorption by the atmosphere and varies with the distribution of cloudiness. The sunshine is now recorded automatically at about 38 regular stations of the Weather Bureau, either by its photographic or its thermal effects. The cloudiness is recorded by personal observations at all stations and is given in the column of "average cloudiness" in Table I.

SUNSHINE.

An instrumental record of sunshine has been kept during the month at 18 stations by means of the photographic sunshine recorder and at 20 stations by means of the thermometric sunshine recorder; the results of these observations are given in Table IV, for each hour of local mean time (not seventy-fifth meridian time). The stations recording the largest percentages of sunshine between the hours of 11 a. m. and 1 p. m. were: Vicksburg, 94.5; Santa Fe, 93.5; Denver, 93; Dodge City, 91.5; Memphis and Galveston, 91; Tucson, 90.5. The stations having the least percentage between these hours were: Portland, Oreg., 36.5; Eastport, 44; Rochester, 48.5; Spokane, 50; Detroit, 53.5.

The general average percentage for the whole month is given in the next to the last column of Table IV. The highest percentages were: Vicksburg, 91; Santa Fe, 90; Denver, 89; Memphis and Tucson, 87; Galveston and Dodge City, 86; Little Rock, 84. The lowest percentages were: Portland, Oreg., 30; Rochester, 39; Eastport, 42; Chicago, 43.

CLEAR SKY.

The average cloudiness between sunrise and sunset, as based on numerous personal observations, is given for each Weather Bureau station in Table I; the complement of this average

cloudiness gives the observer's estimated percentage of clear sky and these latter numbers are given in the last column of Table IV.

COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the duration of direct sunshine whence the percentage of possible sunshine is derived; the observer's personal estimates give the percentage of area of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area of clear sky; the average excess for this month is 8 per cent for photographic records and 8 per cent for thermometric records:

Difference between instrumental and personal observations of sunshine.

Photographic stations.	Instrumental.	Personal.	Difference.	Thermometric stations.	Instrumental.	Personal.	Difference.
Santa Fe, N. Mex.....	90	80	10	Vicksburg, Miss.....	91	89	2
Denver, Colo.....	89	69	20	Little Rock, Ark.....	84	67	15
Memphis, Tenn.....	87	86	1	St. Louis, Mo.....	71	65	6
Tucson, Ariz.....	87	77	10	Salt Lake City, Utah....	73	68	5
Galveston, Tex.....	86	86	0	Wilmington, N. C.....	70	69	1
Dodge City, Kans.....	86	77	9	Key West, Fla.....	69	47	22
Savannah, Ga.....	77	68	9	Louisville, Ky.....	69	58	11
Kansas City, Mo.....	75	71	4	Des Moines, Iowa.....	60	56	4
San Diego, Cal.*.....	72	69	3	Baltimore, Md.....	58	54	4
Cincinnati, Ohio.....	71	60	11	Columbus, Ohio.....	58	50	8
San Francisco, Cal.....	67	64	3	New Haven, Conn.....	58	50	8
Bismarck, N. Dak.....	61	59	2	Philadelphia, Pa.....	58	44	14
Helena, Mont.....	59	49	10	New York, N. Y.....	54	48	6
Washington, D. C.....	57	54	3	Portland, Me.....	51	37	14
Cleveland, Ohio.....	55	44	11	Boston, Mass.....	48	38	10
Spokane, Wash.....	51	35	16	Buffalo, N. Y.....	47	32	15
Eastport, Me.....	42	33	9	Detroit, Mich.....	46	39	7
Portland, Oreg.....	30	31	-1	Chicago, Ill.....	43	41	2
				Rochester, N. Y.....	39	42	-3
				New Orleans, La.....	.....	86	.....

* For 28 days.

NOTES BY THE EDITOR.

EARLY SNOWS IN CONNECTICUT FROM 1783 TO 1882.

Notes of remarkable early snows in Connecticut, communicated by Miss E. D. Larned of Thompson, Windham Co., Conn.:

- 1783, November 21.—Snow 6 inches deep.
 1792, November 23.—Snowed two days; drifted very much; roads impassable.
 1793, October 29.—Snowed all day; very cold.
 1797, November 17.—Exceeding cold for the season; snowed considerably.
 1798, November 2.—Last night it snowed a good deal.
 1800, November 21.—Snowed hard all day; storm very severe. November 23, snowed some; believe the snow is a foot deep; very good sleighing.
 1804, November 12.—Yesterday and to-day it has snowed considerably. November 14, it snowed pretty hard most of the day.
 1805, October 26.—Snowed most of the day.
 1806, November 16.—Snowed all day; snow 8 or 9 inches deep; quite wintry weather.
 1808, November 15.—Snowed steadily all day.
 1809, November 24.—A severe snowstorm all day. November 25, snow nearly a foot deep; people move in sleighs.
 1810, November 2.—Had a severe snowstorm; great quantities of corn, apples, etc., are still outdoors; severe winter weather.
 1811, November 20.—Snowed most of the day; storm very tedious.
 1818, November 15.—Snowed steadily all day; snow more than a foot deep; sleighs move considerably.
 1819, November 29.—Last night we had considerable snow.
 1820, November 12.—Snows in the night and all day; a right winter-cold snowstorm about 8 inches on the level and very solid; hard sleighing; good sledging for a week.

- 1821, November 30.—Snowed all day and night.
 1827, November 6.—Severe snowstorm, about 9 inches.
 1829, November 27.—Snows considerable.
 1831, November 22.—Considerable snow, not melted till January.
 1833, November 25, 26.—Snowy.
 1835, November 23.—Snowed all day; very cold.
 1836, November 17.—Considerable snow.
 1837, November 14.—Severe snowstorm.
 1838, October 28, 29.—Snow; November 8, hard storm and very cold. November 18; 24, 25, snows and extreme cold.
 1840, October 25.—A tedious snowstorm; snow fell a foot deep in some places and lay for several days.
 1841, October 3.—First snowfall; at some places people went to town meeting in sleighs. November 8, a hard snowstorm. Between October 3 and November 22, ground covered with snow four or five times.
 1842, November 30.—First snowstorm.
 1843, November 29.—First snow.
 1844, November 28.—Snowed all day about 5 inches, mercury 10°; some sleighs moved.
 1846, November 25.—A hard snowstorm all day.
 1848, November 11.—Snowed steadily and pretty fast all day. November 20, a very uncommon fall of snow—said to be about 18 inches deep. Sleighs are very thick.
 1851, October 27.—A tedious snowstorm.
 1852, November 23.—Snowed all day.
 1854, November 16.—Some snow.
 1855, November 17.—Snowy afternoon. November 20, snowed all day and night; good sleighing.
 1856, November 29.—Hard snowstorm; very high wind.
 1858, November 14.—Heavy snow.
 1861, November 29, 30.—Slight snow.

1862, November 7, 8.—Violent storm; much snow.
 1864, November 13, 14.—Snow enough for sleighing.
 1865, November 5.—Some snow.
 1866, November 22, 23.—Two days' snowstorm.
 1867, November.—Four inches of snow.
 1868, October 17.—Snowed some hours.
 1869, October 27-30.—Snowed some hours each day.
 1871, November 10.—Rain, hail, and snow.
 1872, November 29.—Snow, hail, and thunder.
 1873, November 12.—Hard storm. November 18, another snowstorm.
 Winter weather and good sleighing.
 1874, November 20.—Snowed considerably.
 1875, November 19.—Snowed some hours.
 1876, October 15.—Snowed all day; 4 or 5 inches deep.
 1877, November 29.—First snow.
 1879, November 3.—First snow.
 1882, November 25.—First snow.

The snows within the last decade, 1883 to date, have been late and scant. The "election" snowstorm, November 5-6, 1894, was the most severe in many years so early in the season. It brings up the average for snowstorms in October and early November to about one in ten years for one hundred and ten years; depth of snow in Thompson, 8 to 10 inches.

OBSERVATIONS AT HONOLULU, HAWAIIAN ISLANDS.

As the weather on our Pacific coast depends so largely upon the conditions of the atmosphere to the westward, it is considered important to publish in full and as soon as practicable the data furnished by observers in Alaska, the Hawaiian Islands, and adjacent regions.

Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, -0.06, is still to be applied.

The absolute humidity is expressed in grains of water, per cubic foot, and is the average of four observations daily.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

AUGUST.

Date.	Pressure at sea level.			Temperature.					Humidity.			Wind.		Cirrus cloud moving from—	Rain measured at 6 a. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Absolute.	Direction.	Force.		
									9 a.m.	9 p.m.					
1..	Ins.	Ins.	Ins.	70	82	73	65	84	71	79	7.0	e., s.	1	Ins.	
2..	30.10	30.04	30.12	70	81	77	66	84	73	84	6.8	s.	1	0.00	
3..	30.11	30.05	30.12	69	84	76	66	85	66	85	6.7	s., ne.	0-3	0.01	
4..	30.11	30.04	30.08	73	80	75	72	83	59	65	6.4	ne.	4	0.02	
5..	30.11	30.05	30.09	72	80	76	70	83	59	64	6.4	ne.	4	0.01	
6..	30.10	30.05	30.11	72	80	75	71	84	59	67	6.2	ne.	4	0.00	
7..	30.10	30.04	30.11	72	81	75	69	85	56	73	6.5	ne.	3	0.03	
8..	30.11	30.06	30.10	72	81	76	66	84	57	63	6.9	ene.	4	0.00	
9..	30.11	30.06	30.10	74	81	75	72	84	61	63	6.1	ne.	4	0.01	
10..	30.12	30.06	30.10	73	80	75	72	83	60	74	6.3	ene.	5	0.01	
11..	30.16	30.08	30.11	73	79	76	73	82	65	63	6.2	nne.	5	0.01	
12..	30.16	30.08	30.15	73	80	76	71	82	58	67	5.9	e.	6	0.00	
13..	30.15	30.09	30.15	73	78	75	71	81	61	63	5.9	ene.	5	0.00	
14..	30.14	30.07	30.12	74	79	76	72	83	56	65	6.2	ne.	5	0.02	
15..	30.16	30.12	30.17	74	80	76	72	83	58	73	6.8	ene.	5	0.00	
16..	30.17	30.10	30.14	74	81	76	73	84	53	63	6.6	ene.	6	0.00	
17..	30.13	30.06	30.09	74	79	75	73	84	56	70	5.9	ne.	5	0.00	
18..	30.10	30.05	32.11	72	80	76	70	83	69	67	6.9	ne.	5	0.00	
19..	30.13	30.06	30.11	73	81	76	71	83	55	65	6.1	ne.	4	0.01	
20..	30.12	30.06	30.12	70	83	73	67	84	60	80	6.8	nne.	4	0.00	
21..	30.12	30.03	30.10	74	82	76	71	84	71	77	7.8	ne.	4	0.03	
22..	30.09	30.03	30.09	74	81	75	73	83	67	69	7.1	ne.	3	0.00	
23..	30.06	30.00	30.05	64	82	76	63	84	53	67	6.1	ne.	3	0.00	
24..	30.06	30.03	30.09	70	81	72	70	83	53	76	6.2	se.	3	0.00	
25..	30.12	30.05	30.10	71	82	74	70	84	57	73	6.9	nne.	3	0.02	
26..	30.08	30.01	30.09	71	83	74	71	86	57	67	6.3	nne.	3	0.00	
27..	30.04	29.97	30.04	68	83	76	68	86	65	74	6.9	s., ne.	2	0.00	
28..	30.04	29.97	30.03	72	81	76	71	83	70	67	7.0	nne.	0-4	0.09	
29..	30.04	29.98	30.05	70	83	74	68	86	62	75	6.7	ne.	4	0.00	
30..	30.07	30.00	30.07	71	83	76	68	86	71	75	6.9	s., ne.	0-4	0.00	
31..	30.07	30.00	30.06	70	84	74	67	86	61	77	6.9	ne.	3	0.00	
30.106	30.043	30.099	71.7	81.1	75.2	69.7	83.8	62.4	69.3	6.53	3.7	0.32	0.00		

Pressure, 30.075, or 0.04 above normal.
 Temperature, 76.0°, or 1.8° below normal.
 Relative humidity, 2 per cent below normal.
 Rainfall, one-sixth of the normal.
 Disturbance periods, 4th, 15th, and 20th; heavy swell at sea 16th to 21st.

SEPTEMBER.

Date.	Pressure at sea level.			Temperature.						Humidity.			Wind.		Cirrus cloud moving from—	Rain measured at 6 a. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Absolute.	Direction.	Force.			
									9 a. m.	9 p. m.						
1..	In.	In.	In.	o	o					%	%					In.
2..	30.07	30.08	30.02	30.11	74	83	77	73	84	55	65	6.9	ne.	3	s. 75 w.	0.00
3..	30.12	30.06	30.12	75	82	77	74	85	58	70	6.9	e. ne.	4	.....	0.00
4..	30.11	30.03	30.12	72	85	77	71	86	68	70	7.4	ne.	3	.....	0.03
5..	30.14	30.06	30.11	76	82	77	75	84	68	64	6.3	ne.	5	.....	0.02
6..	30.11	30.02	30.07	76	81	77	75	83	51	67	6.3	ene.	6	s. 60 w.	0.01	
7..	30.09	30.01	30.07	75	81	77	73	83	59	67	6.6	ne.	6	s. 40 w.	0.02	
8..	30.07	30.01	30.04	75	81	77	74	84	55	59	6.1	ne.	3.5	.....	0.01
9..	30.06	29.99	30.05	74	81	74	69	83	59	77	5.6	e. s.	1	.....	0.03
10..	30.03	29.94	30.03	72	82	75	68	84	63	73	6.7	ne.	4	.....	0.02
11..	30.04	29.96	30.06	68	84	76	67	85	61	73	6.8	e.	3	n. 70 w.	0.00	
12..	30.05	30.00	30.06	69	82	78	68	86	73	73	7.3	s.	2	s. 60 w.	0.00	
13..	30.10	30.05	30.12	72	80	76	71	85	64	64	7.0	ne.	4	s. 70 w.	0.00	
14..	30.15	30.08	30.14	76	82	77	75	85	66	66	6.4	ne.	5	.....	0.00
15..	30.12	30.03	30.09	75	79	77	75	82	60	65	6.6	ne.	4	.....	0.00
16..	30.08	30.00	30.07	73	79	75	73	83	60	65	6.9	ne.	4	s. 80 w.	0.02	
17..	30.08	29.99	30.05	72	80	76	69	81	68	66	6.7	ne.	4	s. 80 w.	0.19	
18..	30.05	29.99	30.05	73	81	76	71	83	60	63	6.3	ne.	4	s. 80 w.	0.05	
19..	30.07	30.00	30.05	74	81	75	74	84	56	67	6.3	ne.	4	.....	0.00
20..	30.06	29.99	30.05	71	77	72	70	84	76	84	7.2	se., n.	1	w.	0.00	
21..	30.06	29.98	30.06	70	81	72	68	82	75	89	7.3	ne.	3	s. 60 w.	0.67	
22..	30.06	29.99	30.06	73	80	75	69	81	66	66	6.8	ene.	4	s. 30 w.	0.07	
23..	30.08	30.03	30.08	73	80	76	71	82	72	66	6.3	ene.	5	s. 30 w.	0.06	
24..	30.12	30.04	30.10	74	78	75	71	82	67	66	6.3	ne.	4	.....	0.05
25..	30.10	30.03	30.11	74	81	75	74	82	69	70	6.5	ne.	4	.....	0.07
26..	30.14	30.07	30.15	72	82	75	70	83	63	63	7.0	ne.	4	.....	0.09
27..	30.19	30.12	30.17	73	80	76	72	82	67	70	7.0	ne.	4	.....	0.05
28..	30.20	30.12	30.18	75	81	76	74	83	58	66	6.4	ne.	5	s. 40 w.	0.00	
29..	30.17	30.10	30.17	74	79	75	74	82	57	66	6.3	ne.	5	.....	0.03
30..	30.17	30.09	30.14	74	77	75	73	81	80	67	6.8	ne.	4	e.	0.02	
	30.099	30.027	30.092	73.1	80.9	75.7	71.6	83.3	63.5	69.0	6.76				1.47	0.00

Disturbance periods, 4th, 13th, and 20th.

NOTE.—Under date of October 11 Mr. Lyons states that the summer of 1894 in Honolulu was cool and dry, with high barometer and only a few hot days at the end of August; but that October begins by being more showery than usual, and that a rainy winter is expected, which may mean a severe winter in the United States, as he has generally noticed a similarity in the character of the seasons in these two countries.

OCTOBER.

Date.	Pressure at sea level.			Temperature.					Humidity.			Wind.		Cirrus cloud moving from—	Rain measured at 6 a. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Absolute.	Direction.	Force.		
									9 a. m.	9 p. m.					
1..	Ins.	Ins.	Ins.	o	o	o	o	o	%	%					Ins.
2..	30.16	29.97	30.15	74	80	75	73	82	64	70	6.4	nne.	5	.....	0.02
3..	30.08	30.00	30.05	72	81	75	71	83	60	70	6.4	nne.	3	.....	0.02
4..	30.00	29.90	29.99	66	83	71	65	83	57	76	6.2	ne.	2-6	.....	0.00
5..	29.99	29.95	30.02	67	72	69	67	80	75	85	7.1	s.	1	.....	0.00
6..	30.03	29.95	30.01	70	73	70	68	76	95	98	7.6	ssw.	1	.....	0.85
7..	29.98	29.91	30.00	70	79	74	69	80	89	76	7.6	sw.	1	.....	0.44
8..	30.07	30.00	30.09	74	81	76	73	82	75	68	7.1	ene.	1.3	.....	0.18
9..	30.12	30.06	30.11	74	79	75	73	82	69	66	6.3	ne.	4	.....	0.01
10..	30.09	30.02	30.09	73	77	73	71	78	55	75	6.8	ne.	3	.....	0.04
11..	30.07	29.99	30.08	72	78	72	71	80	83	70	6.7	ne.	4	.....	0.24
12..	30.09	30.00	30.08	71	79	74	70	80	74	73	6.7	ne.	4	.....	0.12
13..	30.08	30.01	30.08	67	80	75	66	81	63	69	6.4	nne.	3	.....	0.05
14..	30.10	30.02	30.09	72	79	74	66	82	63	66	6.3	nne.	4	n. 40 e.	0.00
15..	30.08	29.99	30.07	67	82	71	66	84	71	90	7.3	e., sw.	0.1	.....	0.01
16..	30.09	30.01	30.09	72	80	75	68	82	60	66	6.7	ne.	3.4	s. 75 w.	0.08
17..	30.11	30.04	30.12	72	79	70	71	81	60	67	6.4	ene.	4	.....	0.01
18..	30.13	30.06	30.11	74	74	74	70	79	66	70	6.4	nne.	3	s. 70 w.	0.01
19..	30.12	30.04	30.10	73	79	75	69	81	60	70	6.6	ne.	3	.....	0.04
20..	30.12	30.07	30.15	72	80	75	69	82	64	68	6.8	ne.	4	.....	0.07
21..	30.15	30.07	30.15	73	80	74	72	82	60	66	6.4	ne.	3	.....	0.01
22..	30.13	30.05	30.12	68	79	71	67	80	59	80	6.4	ne.	2	.....	0.02
23..	30.14	30.05	30.12	70	79	75	68	80	64	70	6.5	ne.	4	.....	0.08
24..	30.12	30.04	30.11	73	79	75	72	81	64	69	6.4	ne.	5	low cir.	0.02
25..	30.13	30.05	30.11	74	77	75	74	80	68	70	6.6	ene.	5	s. 30 e.	0.00
26..	30.14	30.06	30.14	74	77	75	73	81	71	79	6.7	ene.	5	.....	0.07
27..	30.18	30.10	30.16	74	79	75	74	80	60	70	6.4	ne.	5	.....	0.03
28..	30.15	30.07	30.14	73	79	74	73	81	67	79	7.0	ne.	4	s. 75 w.	0.00
29..	30.13	30.03	30.11	70	78	74	70	80	67	67	6.8	ne.	4	s. 80 w.	0.05
30..	30.13	30.05	30.13	73	79	75	72	81	64	63	6.2	ne.	4	s. 60 e.	0.04
31..	30.15	30.05	30.12	74	79	75	75	80	56	66	6.2	ne.	5	.....	0.00
	30.12	30.04	30.12	73	79	74	73	80	59	70	6.2	ne.	5	.....	0.00
	30.103	30.024	30.097	71.6	78.7	73.9	70.2	80.6	63.5	72.0	6.6	6.3			2.62